

that heretofore has been conjectural. As to the statement of Dr. Evans that most work has been done on lupus, there has been a considerable amount done on lupus but an equal amount of research by Ross and others has been done for diseases of the chest in late and early tuberculosis, in which it has been shown that in tuberculosis of the lungs and in early disease of the bones we do get very definite and positive results, both diagnostic and therapeutic.

### THE NAUHEIM TREATMENT OF ACUTE AND CHRONIC HEART FAILURE.

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The Nauheim bath in connection with graduated and resisted movements has won a definite place in the treatment of chronic heart failure, and each year sees a wide range of heart cases favorably influenced by some modification of this system. The reproduction of the essential components of the bath in the form of easily-handled salts has permitted the bath to be taken to the patient, instead of the patient having to undergo the frequently exhausting journey to Nauheim, and the effort even when comfortably housed there of getting to the bath houses for treatment. It is of the artificial Nauheim bath that I wish to speak chiefly.

There are at Nauheim three principal springs used in the bath treatment, differing in chemical composition and in temperature. The ones most used are known as No. 7, No. 12 and No. 14. All are alkaline, effervescing springs of a temperature of 87 degrees to 92 degrees, and it is the active ingredients of these springs that most of the artificial Nauheim bath products seek to reproduce. The common form that most of these reproductions take, is illustrated by several of those that are extensively advertised, and which are merely two-pound packages of bicarbonate of soda and  $1\frac{3}{4}$  pounds of acid sodium sulphate put up in the form of flat, round cakes and wrapped in oiled paper or tinfoil, or both. This protects them somewhat from moisture and from the action of the soda. The objections to this form of the bath are, that the chlorides, which form an important part of the ingredients, are omitted. The reasons are simple. The potassium and magnesium chlorides are expensive; the seven or eight pounds of sodium chloride which are necessary are very heavy, and the calcium chloride has so strong an affinity for water that it is handled with difficulty, besides being very irritating to the skin when handled in its solid form.

At Nauheim the calcium salt, known as "mutter lauge" is not a natural ingredient of any of the springs in sufficient quantity to be effective in the bath, but is added to the bath after it is drawn. It is a by-product of a neighboring chemical works, and is used because of its stimulating effect on the skin, augmenting and prolonging the effect of the CO<sub>2</sub> effervescence. Its import as a part of the bath is reflected by the bath attendants and patients alike, the latter often paying a few pennies for a more generous measure of the fluid. A further objection to the artificial

bath lies in the poor way the acid sodium sulphate is packed. Unless it is kept in a dry place it is bound to absorb moisture and crumble, and the free sulphuric acid escapes from the inadequate covering, leaving the cakes too weak to react later in the soda solution.

A use of two of the different forms of the bath for a year led me, on account of unsatisfactory results, to try the production of gas by releasing acid from bottles in a soda solution. This gave a very uneven effervescence, and it was hard to regulate it. Besides, the acid was hard to handle. At this point, I enlisted the services of R. R. Rogers, then professor of chemistry at Cooper Medical College, and we began a series of experiments to obtain more reliable acid sulphate and a means of handling it and the calcium chloride. To Mr. Rogers is due the credit of devising a paraffined paper box, the cover of which is put on after the acid sulphate or calcium chloride is put in, and while the paraffine is still warm. This enables it to be sealed in air-tight, and it requires no handling when the bath is prepared, for each box contains just enough for one bath. The acid sodium sulphate which we used at first was a waste product obtained in the manufacture of sulphuric acid by the old process of boiling. Before all the H<sub>2</sub> SO<sub>4</sub> has been removed, a point is reached when it is no longer profitable to continue the extraction, and at this point the product has about enough acid component to serve our purpose. It had the advantage or disadvantage of containing a good deal of iron, as the boiling is done in iron kettles, and this precipitates out in alkaline solution in the form of a heavy, rust-colored sediment. In this form it is a component of certain of the springs at Nauheim, but probably it has no advantage, and it is certainly disturbing from the point of view of cleanliness.

To obtain an acid sulphate free from iron, it was necessary to boil Glauber salts with sulphuric acid. A proper proportion can be estimated readily, and the end product when packed in the paraffine boxes will keep indefinitely without change. The proper proportion of the chlorides of potassium and magnesium was obtained in a sea salt in which the potassium and magnesium chloride existed as impurities. With the materials properly packed, it is a very simple matter to grade the strength of baths, as is desirable in the beginning with bad cases.

The advantages of the whole treatment at Nauheim are very great in a class of patients with nervous heart troubles who are better off far removed from social and business responsibilities. The hotels and private hospitals there are comfortable, some of them even quite luxurious, and it is certainly true that it is easier for some patients to do what every one about them is doing. Against this advantage is the distance to Nauheim, making it prohibitive in a large range of acute cases and in advanced chronic cases still in condition to be benefited by the treatment; the closing of the baths in winter; the effort of reaching the baths from the hotels, even when wheel chairs are used; and the lack of supervision in the bath, for the patient is turned over to an ordinary

bath attendant, with a prescription on his bath card from the doctor for a certain bath of a given temperature for a definite time. In my experience so much depends on the way the bath is given, and so much can be done by the attendant to make the bath effective, that I am convinced the patient needs supervision while in the bath. I have had treatments at Nauheim and at home and have had them given for me here by a number of supposedly trained people, and it has been a matter of astonishment to me how much difference there is in the result when the same patient is handled well or badly in the bath. For this reason I never encourage the Nauheim treatment except under favorable conditions and administered by a skilled nurse who understands the importance of watchfulness and the effects which the bath and movements are expected to produce. Under proper conditions, treatments may be given to patients even at the bedside, using a folding rubber tub filled by a hose from the nearest running water. The patient is lifted by two attendants and lowered easily into the tub, a rubber air pillow allowing the head to rest comfortably. This caution is not necessary except in bad cases or with the failing hearts of those with acute infectious diseases.

The cases best fitted for Nauheim treatments are those in which the heart muscle acts insufficiently, either from arterio-sclerosis with changes in the muscle, or dilatation, or poor blood supply from anemia, or poisoning, acute or chronic, particularly after severe infectious diseases or tobacco poisoning, and fatty changes of moderate degree. It has been supposed that fever from any source was a contra-indication for the bath, and in the writings of most advocates of the treatment this statement is universally repeated. It seemed to me, however, that the effect of the bath, which is to slow and deepen the respiration, slow the pulse, increase the volume of blood in the peripheral arteries, raise the blood pressure, increase the urine, and finally to quiet nervousness and restlessness, were just the things one wanted to bring about in many cases where the heart was weak as the result of toxic and febrile causes. Through the kindness of Dr. Ainsworth and the staff of the Southern Pacific Hospital I had the opportunity of trying the effects of the bath on a series of fifteen cases of pneumonia and two typhoids. The results are published elsewhere, and it is sufficient to say that the results were so encouraging that I hope for further opportunity for trying the treatment. It effectually settled the point that there is no risk in giving the bath to patients with temperatures even above 104 degrees, and in all such cases the temperature was reduced about two or three degrees for several hours. Blood pressure determinations showed a constant rise of about 10 mm., which was also appreciable for several hours. Slight hemorrhage from the bowel occurred in the two typhoid cases—in one after six baths, and the other after ten—a further evidence of the increased blood pressure, and a sharp warning of this danger in typhoid from the Nauheim treatment. I shall not consider this class of cases fur-

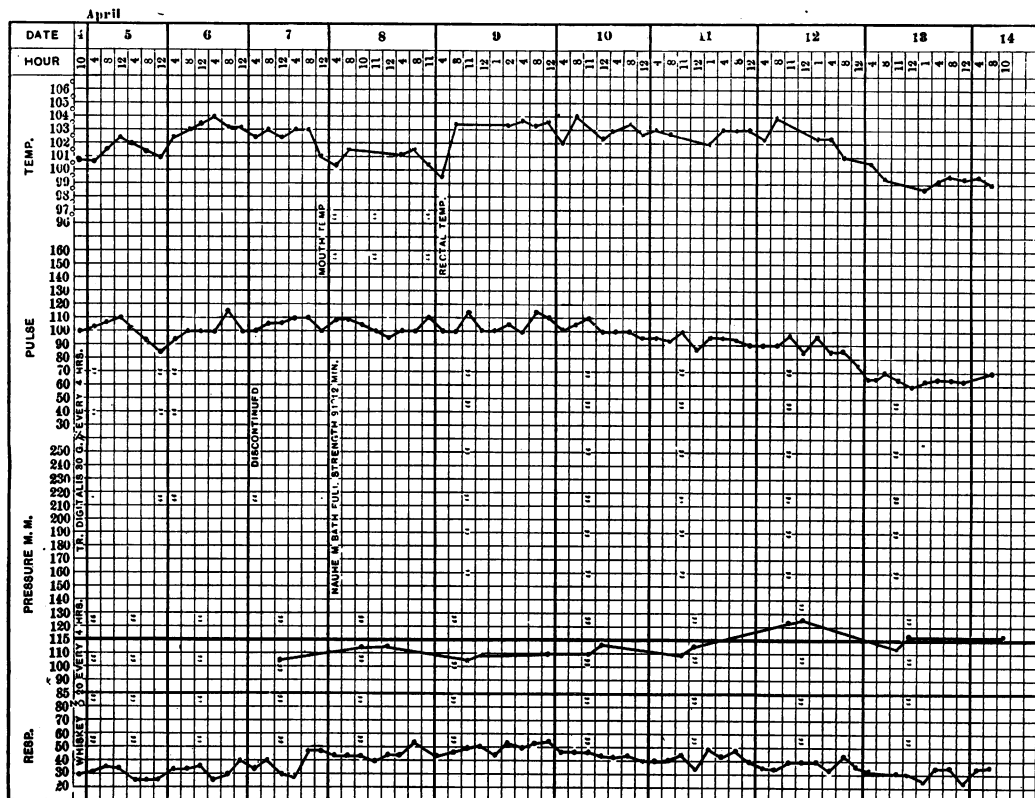
ther, as it is my intention to go into it more fully in the near future.

At Nauheim the patient is supposed to see his physician daily, and after the initial examination he is given a card on which the temperature, duration and kind of bath he is to take are indicated. At each visit his card is again inscribed with the bath data for the next treatment. The movements are given generally some time after the bath, no special system being followed, the convenience of the operator regulating it in most cases. Some of the physicians prescribe no movements, and in conversation with several, and in their printed articles, it is difficult to get much information about their estimate of the value of the movements. To the Schotts belongs the chief credit of developing this auxiliary system of strengthening the heart muscle. The principle back of it depends upon the fact that the heart meets a slight increase in the amount of work put upon it by a more forceful and slower contraction, continuing from a number of seconds to almost a minute. If this effort put upon it is systematically repeated, the heart will meet it by a steady continuance of the slower and stronger contraction. The movements are similar to those used in ordinary gymnastics, the same movement never being repeated twice in succession by the same muscles, and generally they are made first on one side, then on the other. The movement is slow, and is guided by the hand of the person giving the treatment. This guidance is gradually replaced by a certain amount of resistance to the patient's efforts. The resistance is increased or diminished to meet the indications shown by the action of the heart. The dilation of the peripheral vessels brought about by the bath, and the improved heart action, make it usually best to follow the bath after an hour's rest by the movements. This is by no means an arbitrary rule, for certain cases are better affected by the movements given some time before the bath; it may even be wise to give them as nearly as possible half-way between baths. The effect of the movements may be tested by any one in a case where the pulse is rapid, except possibly a case of exophthalmic goitre. In my experience the movements are useful in slowing as well as strengthening the pulse. The problem with heart cases is simply adapting the principle to the individual case.

For a full consideration of the technic of the bath and movements I would refer one to Babcock's book on heart diseases, Thorne's work on the Nauheim treatment, and Groedel's monograph on the same subject.

The following cases serve to illustrate the effect of the treatment on various types of heart cases:

Case 1, P. K. B., aged 36, palpitation and intermission, following severe diphtheria, augmented by the use of tobacco. At the time baths were begun tobacco had not been used for a month. The heart, nevertheless, was omitting every third or fourth beat and the rate was between ninety and one hundred. Blood pressure, one hundred and twenty with Stanton machine. Digitalis had been tried, with the effect of steadying the heart somewhat, but its withdrawal was followed by a return of the rapid action



and intermission. Two courses of Nauheim baths were given; a ten days' intermission between them. Twenty baths in each course. In the first series resisted movements followed the baths twenty minutes. In the second series they preceded the bath. After the first five baths the heart would frequently beat fifty or sixty times without any intermission. The rate for some hours after treatment fell 15 to 20 beats, reaching normal at the end of the fifth beat. From that time on, pulse varied from 72 to 82, being brought down sometimes to 68 after treatment. The second series of baths was carried out in order to study the effect of movements given before the baths. In this particular instance, it was shown definitely that resisted movements had quite the same effect as the bath, but upon evenings that they were not followed by the bath, the effect was not as lasting by several hours.

Two years have passed since the first treatments and during that time, though smoking has been resumed in moderation, the heart has never been intermittent. The second series of baths showed a uniform rise of 10 to 12 mm. in the blood pressure after the bath. The heart rate, which had never been much above 80, after the first course, was improved, so that it remained most of the time in the seventies. The exhaustion after work which preceded the first baths and which had begun to show itself again, was relieved.

Case 2. G. B., aged 47. History of excessive use of alcohol and tobacco, long-continued sedentary habits, obesity, unrecognized pleural effusion after pneumonia, requiring subsequent operation for removal. Heart rhythm fetal in character. Extreme pain and dyspnoea on slight exertion. Diagnosis, fatty infiltration of heart. The effect of the baths is indicated on the accompanying chart, the diagram showing the pulse before and after treatment. Resisted movements were given before the bath. Patient, a year and a half later, without further treatment, is very comfortable. On the Von Norden anti-obesity diet he lost 40 pounds.

Case 3. J. W. W., aged 64, suffering with advanced myocarditis, general arteriosclerosis, subsequently developing intermittent claudication, and finally died of general cerebro-spinal softening manifested as a progressive paralysis. Under my care he had one severe attack of tachycardia. Following this the pulse, which had been in the nineties before, ranged above 100 despite the administration of small doses of digitalis. Nitroglycerin with it had no effect on the pulse. The administration of even moderate doses of digitalis seemed to make the pulse worse, as indicated by the chart. The result of the Nauheim treatment is indicated in this case by the morning and evening pulse, the records of the immediate effect upon the pulse having been destroyed. The patient, who had been bed-ridden for more than two months, was sitting up in two weeks and walking in less than three. Overdoing led to an acute return of symptoms a month later and the symptoms of softening followed rapidly. The case is presented as illustrating that even in extremely advanced myocarditis, benefit can be obtained from the baths, although in such cases they must be given with extreme care.

Case 4. Mrs. M. G., aged 66. History somewhat the same as Case 3, except for the addition of cardiac pain on any exertion. The chart here indicates the rapid effect of the bath, the progressive benefit during the ten days in bed, and the sustaining of the better pulse during the period of activity that followed. This patient was seen on April 16, 1906, one year after the treatments, with a return of the pain and rapid heart action. Treatment was prevented by the earthquake. She died two weeks later of angina before treatment could be begun.

Case 5. Mrs. M., aged 57. Illustrates simply the greater benefit that followed the giving of resisted

movements twelve hours after the bath. The first part of the chart indicates the pulse right after the treatments, in which the movements immediately preceded the bath. The case was one of advanced myocarditis, which had been benefited previously by treatments similar to the first of the series indicated in this chart. One year later, patient's pulse reached 140 in another attack of dilatation. Twelve baths were given, with the extremely interesting result indicated on her chart.

Case 6. Mr. C., aged 44. Arteriosclerosis, locomotor ataxia, palpitation, extremely poor heart tones. In this case the patient was given Frankel movements for a bad ataxia instead of resisted movements. These movements were much more taxing than resisted movements. The chart shows the effect of the movements, judiciously given, on the pulse. In almost every instance they lowered the pulse, which was still further lowered by the bath.

This form of treatment of locomotor ataxia I have given to a number of patients, and while the Frankel movements need no further commending from me, I wish to add that the treatment combined with the bath has served an excellent purpose in relieving a great many of the symptoms of this disorder. I refer particularly to the spasmodic muscular contractions, which are sometimes very painful. It seems likely that the improved circulation is responsible for the benefit.

Case 7. J. F., aged 57. Advanced case of arteriosclerosis with extensive changes in the heart muscles and some renal changes; marked irregularity in the rate and force of pulse; frequently 20 beats in 100 not registered at the wrist. At the time I saw this patient he had been four months in bed, on all manner of heart stimulants, and had had four attacks of acute dilatation with delirium cordis. In the last of these attacks he fell into my hands. At that time his pulse was 120 to 130 when counted with a stethoscope; about 90 at the wrist. The early record of the baths I regret I did not keep. This patient, now nearly a year later, is able to be about and to take light exercise. The heart is still extremely irregular in rate, but the muscular insufficiency is not accompanied by any subjective symptoms. In this case, as in a good many others, the baths were frequently followed by an hour or two of quiet sleep, and for the first time the patient was able to do without hypnotics. The use of opium in such cases I can not commend too highly, particularly in the beginning of attacks that result from over-effort of the heart.

Case 8. Mrs. E. S. H., aged 67. Was seen after a year of intermittent rest and drug treatment for paroxysmal tachycardia due to sclerosis of the aortic arch and aggravated by emotional and gastric disturbances. This patient had twenty baths, not always with the desired result, owing to indiscretions of diet and to emotional disturbances that I could not control. An attack of tachycardia, lasting twenty-four hours, enabled me to try the bath as a means of shortening it. I had given her in one previous attack digitalis and nitroglycerin, without perceptibly influencing the attack, which lasted two days. The attack treated by the bath was shorter than the previous one, but the bath itself seemed to increase the pulse action slightly. Two things were interesting in the case. First, the doubling of the pulse in tachycardia, a fact which I also observed in one other case where the pulse raised from 70 to 140 in one attack of fifteen minutes' duration, and to 280 in an attack an hour or two later. This doubling of the pulse has been called attention to by Hewlett. The second interesting observation is that, although the patient was having two or three of these attacks a month prior to the baths, she has had only one in the five months since. This I attribute largely, however, to more attention paid to the diet.

Case 9. D., aged 40, laborer. Admitted to the

hospital February 15, 1906, 48 hours after a severe chill followed by pain in the left nipple region and a cough with expectoration; he had had no care for two days; loss of appetite, and had eaten but little. Previous history negative; smokes and drinks moderately.

Patient is a strongly-built man, broad, thick chest. Heart condition normal, urine normal. Temperature 102 degrees. Pulse, 100. Respiration, 30. Distinct signs of pneumonia of left side, involving both lobes. Pulse weak and heart tones, though clear, rather weak. Blood pressure, 102. Patient given Nauheim bath, full strength, 15 minutes' duration. He had a crisis on the fourth day. Was given two hypodermics of citrate of caffeine, owing to the feebleness of his pulse on his entrance. Except for this no medicine was given him.

Case 10. D. P., entered the hospital April 4, from S. P. Tunnel No. 1, with the following history: Attack of pleurisy 1904. Patient drinks occasionally to great excess; smokes constantly. Had been working in the tunnel for some months, when on April 1, he was seized with a violent chill; accompanying this was a pain in the left chest, which was increased by coughing; he had a very bad headache and no appetite. He received no attention whatever until four days later, when he was admitted to the Southern Pacific Hospital at 9:30 p. m. At this time his bowels had not moved for two days; tongue was coated. Temperature, 101 degrees; respiration, 30; pulse, 100. There was distinct consolidation of the left lower lobe. He was given a pneumonia jacket and put to bed; mustard and flaxseed poultice to chest. I examined patient the morning of April 7. At this time pulse was 106; blood-pressure, 107; respiration, 40; temperature, 103 degrees. There was a consolidation of the whole left side, which became more apparent in the upper lobe the next morning. His heart condition at this time was fairly good, but as it was the seventh day of the disease and no crisis had occurred, the patient was given a Nauheim bath. His blood pressure the day after the first bath had fallen to 100. The nervous disturbances of the first bath were probably the cause of the increase of fever just prior to the bath. The patient was very comfortable following the bath, and was never at any time thereafter in any critical condition, although the crisis did not occur until the twelfth day. The chart indicates one interesting fact—that from the second day of the bath the pulse and respiration fell steadily. The temperature was influenced for from four to six hours by the bath, and the blood pressure rose steadily.

Conclusions: The Nauheim bath, properly given, with resisted movements, has a distinct place in the treatment of acute and chronic heart failure.

It is of advantage to simplify the treatment, and for this reason it is best given in the patient's home where conditions are favorable.

This admits further of the use of the bath in a much wider range of cases than were heretofore considered possible, particular emphasis being laid on the type of cases represented by cases 9 and 10, both treated for the heart condition of pneumonia by this means.

In spite of the peripheral vascular dilation, the blood pressure is almost invariably raised by the bath in uncomplicated cases of muscular heart weakness. Where the pressure is already high from arterial and renal changes, it is generally the case that the pressure is unchanged. It may even fall slightly. (Cases 6 and 8.)

## ALCOHOL: THE EFFECT OF ITS USE AND ABUSE.

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Alcohol, chemically known as ethyl-alcohol, is a member of a group of oxygen derivatives of the hydrocarbons and is closely related physiologically as well as pharmacologically to ether, chloroform, chloral, etc. It has been classified among the stimulants; some have considered it a nutriment, while it has been spoken of by (1) Rubner as a refreshment ("erfrischungsmittel"), and still others have placed it as "genussmittel" (relish), in line with coffee, tea, spices, etc. If alcohol, however, is to be regarded as belonging to the last-mentioned category, it must be taken in certain limited quantities, inasmuch as a daily use of more than 10 to 20 grm. (2½ to 5 drms.) may do harm; hence a daily use, for instance, of a pint of lager beer, which contains 12 to 15 grms. of alcohol, could hardly be considered harmless.

(2) Edwin Faust and Trautmann have proved by careful investigations that morphin and veronal can act as nutriments; there seems, therefore, no more justification for the administration in general practice of alcohol as a nutriment than there is for the use of morphin or veronal for this purpose. The value of alcohol as a nutriment has been expressed in a few rather dramatic words by Prof. Atwater, of Wesleyan University, Middletown, Connecticut, who says, "Alcohol is a nutriment, alcohol is a poor nutriment, alcohol is a damned nutriment." Alcohol as a refreshment does, like tobacco, have the effect of tiding man over the afflictions and torments of life but the trouble is that alcohol, even as a refreshment, is attended with grave dangers to many people because of the difficulty of finding "the suitable dose"—if it is left to the individual to determine this for himself.

The use of alcohol as a medicine has been recommended in conditions of collapse, in typhoid fever, pneumonia, or other cases of heart-failure, in acute and chronic infectious diseases, in loss of appetite from various causes, in certain nervous conditions as sleeplessness, mental depression, attacks of fear or fright, and in certain neurasthenic conditions. Among these various indications it would seem that alcohol in the form of wine acts favorably where the chief object is to maintain life, but it has not yet been fully determined whether Binz is correct when he claims that alcohol increases the amount of the exhaled air and elevates the blood pressure when it is given in moderate quantity (about 2 to 2½ oz. of sherry or 10-15 grm. alcohol). It would also seem that alcohol in doses of 5-10 grms. at each meal increases the appetite for food and stimulates the gastric secretion, except in cases of chronic diseases like tuberculosis. In cases of weakness and over-fatigue of the nervous system, however, Eduart Hirt says there

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